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ABSTRACT

This document presents summary information in chart form on medications used by students with visual and hearing impairments. First, a checklist identifies educational considerations for students who are medicated. Next, common antipsychotic, anticonvulsant, antiasthmatic and other drugs are listed in chart form with drug name, indications, peak effect, possible ocular side effects, possible central nervous system (CNS) and motor effects, and other possible effects. Another chart lists drug interactions including both the effect of the drug on activity of other drugs and the effect of other drugs on the primary drug's activity. The next chart identifies educational implications of ocular, CNS, and other side effects. A glossary lists 28 terms. (Nine references) (DB)

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MEDICATIONS USED BY STUDENTS WITH VISUAL AND HEARING IMPAIRMENTS: IMPLICATIONS FOR TEACHERS

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EDUCATIONAL CONSIDERATIONS FOR STUDENTS WHO ARE MEDICATED

- √ Prior to assessment and instruction gather input from all sources. Be sure to ask about medications, noted side effects and peak effect times.
- √ Notify parents and/or physicians of any observed side effects.
- √ Provide frequent rest periods and changes in activities.
- √ Consider effects of medication when scheduling assessment and instruction.
- √ Use common sense when modifying instruction.
- √ High contrast, simplified figure-ground contrast, and adjustments in lighting may be helpful.

ANTIPSYCHOTICS					
NAME	INDICATIONS	PEAK EFFECT	POSSIBLE OCULAR SIDE EFFECTS	POSSIBLE CNS & MOTOR EFFECTS	OTHER POSSIBLE SIDE EFFECTS
ATIVAN (LORAZEPAM)	Nervousness or tension		Decreased vision, allergic reactions, conjunctivitis, photosensitivity; blepharospasm, decreased spontaneous movements, jerky pursuit movements, nystagmus, decreased accommodation, diplopia, mydriasis, decreased reaction to light, color vision defect, photophobia, lacrimation, burning sensation, ocular pain	Clumsiness, drowsiness, dizziness; hallucinations, confusion	Irritability, rash, itch constipation or diarrhea, nausea, vomiting, difficult urination, vivid dreams
HALDOL (HALOPERIDOL)	Severe anxiety, agitation and psychotic behavior		Decreased vision, decrease or paralysis of accommodation, mydriasis, allergic reactions, photosensitivity, blepharospasm	Visual hallucinations, shuffling, stiffneess, jerkiness, shakiness	Constipation, dry mouth
MELLARIL (THIORIDAZINE HCl)			Blurred vision	Drowsiness	Dryness of mouth, constipation, nausea, vomiting, diarrhea, nasal stuffiness
VALIUM (DIAZEPAM)	Anxiety, tension or agitation; may be used in the relief of skeletal muscle spasms		Decreased vision, allergic reactions, conjunctivitis (nonspecific); photosensitivity; decreased spontaneous movements, jerky pursuit movements; nystagmus, decreased accommodation; diplopia, mydriasis, decreased reaction to light, color vision defect, photophobia, lacrimation, burning sensation, ocular pain	Clumsiness, drowsiness, dizziness; hallucinations, confusion	Irritability, rash, itch constipation or diarrhea, nausea, vomiting, difficult urination

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ANTICONVULSANTS					
NAME	INDICATIONS	PEAK EFFECT	POSSIBLE OCULAR SIDE EFFECTS	POSSIBLE CNS & MOTOR EFFECTS	OTHER POSSIBLE SIDE EFFECTS
CLONOPIN (CLONAZEPAM)	Akinetic and myoclonic seizures. Possible in absence seizures	1-2 hours	Abnormal eye movements, diplopia, glassy-eyed appearance, nystagmus	Headache, hemiparesis, hypotonia, tremor, vertigo, muscle weakness & pain	Respiratory depression, shortness of breath
DEPAKENE (VALPROIC ACID)	Antiepileptic for simple & complex absence seizures	1-4 hours	Nystagmus, diplopia, spots before eyes, visual hallucinations (rare side effects which are reversible with discontinued drug use)	CNS depression, sedative effects, dizziness, uncoordination	
DILANTIN (PHENYTOIN)	Prophylaxis and treatment of chronic epilepsy--antiepileptic for control of tonic-clonic & psychomotor seizures	1.5-3 hours	Nystagmus, decreased vision, decreased reaction to light, paralysis of extraocular muscles, ptosis, diplopia, decreased accommodation, decreased convergence, visual hallucinations, problems with color vision, cataracts, (nearly all are reversible after discontinuation of drug use)	Decreased coordination, mental confusion, dizziness, slurred speech, ataxia	
MYSOLINE (PRIMIDONE)	Grand mal, psychomotor, or focal epileptic seizures		Diplopia, nystagmus	Ataxia, vertigo	Nausea, anorexia, vomiting, fatigue, hyperirritability, emotional disturbances
(PHENOBARBITOL) ALLOBARBITOL, BUTABARBITOL, SECOBARBITOL	CNS depressant, hypnotics, sedatives, anticonvulsant	1.5 -3 hours	Ptosis, mydriasis, decreased reaction to light, diplopia, decreased convergence, jerky pursuit movements, random ocular movements, nystagmus, decreased vision	Confusion or euphoria, drowsiness, vertigo, ataxia	Stupor, delerium
TEGRETOL	Psychomotor & grand mal seizures	4-5 hours	Photosensitivity, blurred vision, visual hallucinations, transient diplopia, oculomotor disturbances, nystagmus, conjunctivitis	Dizziness, drowsiness, confusion, headache, fatigue	

ANTIASTHMATICS					
NAME	INDICATIONS	PEAK EFFECT	POSSIBLE OCULAR SIDE EFFECTS	POSSIBLE CNS & MOTOR EFFECTS	OTHER POSSIBLE SIDE EFFECTS
INTAL CROMOLYN	Bronchial asthma Inflamation of covering of eye & cornea	10-60 mins.	Lacrimation	Dizziness, headache, joint swelling & pain	Nasal congestion, urinary frequency, throat irritation & dyness, bad taste, cough, wheezing, nausea
NEO-SYNEPHRINE (PHENYLEPHRINE)	Allergies, colds or sinusitis		Mydriasis; decreased vision, conjunctival vasoconstriction; irritation, lacrimation, photophobia, ocular pain; keratitis, allergic reactions to eyelids or conjunctiva , conjunctivitis, blepharospasm, aqueous floaters,	Visual hallucinations	Fast or pounding heartbeat; headache or dizziness; shakiness, insomnia, burning, stinging, dryness inside nose
PROVENTIL (A: BUTEROL)	Bronchial asthma, allergies, bronchitis, or other conditions that cause spasm of the bronchial tubes		Decreased vision, possible diplopia, belpharoconjunctivitis, decreased lacrimation	Visual hallucinations, dizziness, lightheadedness	nausea or vomiting
THEO-DUR SPRINKLES (XANTHINE BRONCHO DILATOR, THEOPHYILLINE)	Bronchial asthma			Headache, irritability nervousness, insomnia; dizziness, or lightheadedness.	Nausea, restlessness, vomiting, stomach pain

MISCELLANEOUS					
NAME	INDICATIONS	PEAK EFFECT	POSSIBLE OCULAR SIDE EFFECTS	POSSIBLE CNS & MOTOR EFFECTS	OTHER POSSIBLE SIDE EFFECTS
LEVOTHROXINE	Thyroid hormone deficiency		Decreased vision, blepharospasm, photophobia, paralysis of extraocular muscles, ptosis, double vision, scotomas, constricted visual fields, hemianopsia	Tremor, headache, irritability; visual hallucinations	Appetite change, diarrhea, leg cramps, menstrual irreularities, fever, heat sensitivity, unusual sweating, weight loss
PREDNISONE, CORTISONE (CORTICOSTEROIDS)	Allergic diseases; blood disorders, kidney deseases, asthma and corticosteroid deficiencies		Decreased vision, decreased resistance to infection, mydriasis, myopia, exophthalmos, diplopia, paresis or paralysis of extraocular muscles, ptosis, color vision defect, scotomas, constriction of visual fields, enlarged blind spot	Muscle cramps, swollen legs or feet, mood change, fatigue, insomnia, weakness, restlessness	Acne, poor wound healing, thirst , indigestion, nausea, vomiting, decreased growth in children, weight gain, irregular menstrual periods
REGLAN (METOCLOPRIMIDE HYDROCHLORIDE)	Gastroparesis	30-60 minutes		Restlessness, drowsiness, insomnia, headache, dizziness	Nausea or bowel disturbance
TIMOPTIC, BETOPTIC	Elevated ocular pressure	1-2 hours	Conjunctivitis, blepharitis, keratitis, refractive changes		Appetite change, diarrhea, leg cramps, menstrual irregularities, fever, heat sensitivity, unusual sweating, weight loss

DRUG INTERACTIONS

CLASS: PRIMARY DRUG	EFFECT OF DRUG ON ACTIVITY OF OTHER DRUGS	EFFECT OF OTHER DRUGS ON PRIMARY DRUG ACTIVITY
ANTIANXIETY AGENTS Lorazepam Valium	alcohol Δ analgesics Δ antihistamines Δ barbiturates Δ sedatives-hypnotics Δ	alcohol Δ analgesics Δ barbiturates Δ sedatives and hypnotics Δ
ANTICONVULSANTS: Clonopin	alcohol Δ analgesics Δ antihistamines Δ barbiturates Δ sedatives-hypnotics Δ	alcohol Δ analgesics Δ barbiturates Δ sedatives-hypnotics Δ
Depakene	Barbiturates Δ	
Dilantin	analgesics Δ barbiturates Δ corticosteroids ∇ Vitamin D ∇	analgesics Δ salicylates Δ (aspirin) alcohol ∇ antihistamines ∇ barbiturates ∇ sedatives and hypnotics ∇
Mysoline Phenobarbitol	alcohol Δ antibiotics Δ (myacins) sedatives-hypnotics Δ ∇ analgesics ∇ antihistamines ∇ salicylates ∇ (aspirin)	alcohol Δ analgesics Δ ascorbic acid Δ antihistamines Δ ∇
ANTIPSYCHOTIC AGENTS Haldol	alcohol Δ analgesics Δ barbiturates Δ sedatives-hypnotics Δ	alcohol Δ analgesics Δ barbiturates Δ
Mellaril	alcohol Δ analgesics Δ antihistamines Δ barbiturates Δ salicylates Δ (aspirin) sedatives-hypnotics Δ	alcohol Δ sedatives-hypnotics Δ antacids ∇ barbiturates ∇

from: Fraunfelder, F.T. (1989). Drug-Induced Ocular Side Effects and Drug Interactions (3rd ed.) Philadelphia: Lea & Febiger.

EDUCATIONAL IMPLICATIONS OF SIDE EFFECTS

POSSIBLE SIDE EFFECT	POSSIBLE EDUCATIONAL IMPLICATIONS
OCULAR	*IN GENERAL: Limit visually dependent tasks, pair other sensory cues with visual to support visual information, vocalize any visually presented material.
OCULAR MOTOR DISTURBANCE (abnormal eye movements, nystagmus, paralysis of extra ocular muscles, ptosis, blepharospasm, decreased accommoda tion, decreased convergence, decreased spontaneous movements, jerky pursuit movements, random ocular movements)	•Do tasks which do not require fine detail work. •Difficulty in tracking and tracing, don't do activities which require these skills or involve projectiles which may cause injury. •This may be a good time to work on listening skills, language or daily living skills. •Provide frequent rest periods. •Decrease stress & rhytmic movements. •Make sure that presented materials are stationary
VISUAL CHANGES (diplopia-double vision, spots before eyes-aqueous floaters, decreased vision, problems with color vision-color vision defects, cataracts-cortical lens opacities, myopia, blurred vision, refractive changes)	•Try to do tasks with low visual demand. •Provide uncluttered environment with simple figure-ground, high contrast of materials. •Familiarize to environment. •Allow additional time for response. •Consider frequent rest periods. •Consider magnification.
IRRITATIONS & INFLAMMATIONS (conjunctivitis-blepharoconjunctivitis, blepharitis, keratitis, decreased resist ance to infection, irritation, allergic reaction to eyelid or conjunctiva, b rning sensation)	*ALERT MEDICAL PERSONNEL. •Do activities which keep hands busy. •Child's face and hands should be washed frequently. •Lighting should have reduced glare. •Allow for frequent rest periods
PHOTOSENSITIVITY (decreased reaction to light, mydriasis, photophobia)	•Adjust lighting conditions. •Generally a bad time for outside activities. •Consider the use of a visor or sunglasses. •Consider glare when placing materials. •Assessment may show avoidance of light or no pupillary response.
FIELD DEFECTS (hemianopsia, constricted visual fields, enlarged spot, scotomas)	•Do seat work. •Limit physical movement in environment. •Allow for eccentric viewing. •Teach organized search patterns. •Consider lighting options.

EDUCATIONAL IMPLICATIONS OF SIDE EFFECTS

POSSIBLE SIDE EFFECT	POSSIBLE EDUCATIONAL IMPLICATIONS
OCULAR	
MISCELLANEOUS (glassy-eyed appearance, lacrimation, decreased lacrimation, ocular pain)	*ALERT MEDICAL PERSONNEL
CENTRAL NERVOUS SYSTEM AND MOTOR	*ALERT MEDICAL PERSONNEL
MOTOR DISTURBANCES (hemiparesis, hypotonia, tremor, muscle weakness, uncoordination, decreased coordination, weakness, ataxia, joint swelling or pain, swollen legs or feet, muscle cramps, shuffling, stiffness, jerkiness, shakiness)	•Consider physical position--help students be physically stable and comfortable. •Try to schedule physical activities at another time •When walking or moving, allow extra time, walk near a wall for support when needed.
MOOD CHANGES (mental confusion, euphoria, restlessness, irritability or hyper irritability, nervousness, emotional disturbances, delirium, drowsiness, fatigue, lightheadedness, stupor)	*ALERT MEDICAL PERSONNEL •Repetition and establishment of routines may be helpful. •Eliminate distractors. Provide activities that reduce mood change. •Take frequent breaks.
MISCELLANEOUS (headache, vertigo, pain, dizziness, sedative effects, slurred speech, insomnia)	*ALERT MEDICAL PERSONNEL •Take frequent rest periods
OTHER	
RESPITORY (respitory depression, shortness of breath, nasal congestion, throat irritation and dryness, cough, wheeze, hypersecretions in upper respitory passages; burning, stinging, dryness in nose)	*ALERT MEDICAL PERSONNEL •Allow for frequent rest periods. •Limit physical exertion (for example; P.E., O&M, P.T., recess)
GASTROINTESTINAL (nausea, vomiting, indigestion, anorexia, stomach pain, appetite change, urinary frequency or difficulty. bowel disturbances, constipation, diarrhea)	*ALERT MEDICAL PERSONNEL •Allow for frequent breaks or rest periods.
MISCELLANEOUS (fast or pounding heartbeat, menstrual irregularities, fever, heat sensitivity, unusual sweating, weight loss, weight gain, acne, poor wound healing, decreased growth, rash, itch)	*ALERT MEDICAL PERSONNEL

Glossary

(Definitions from Dorland's Pocket Medical Dictionary. (1989). Philadelphia: W.B. Saunders Company, and Griffith, H.W. Complete Guide to Prescription and Non-Prescription Drugs (1990).

anorexia--lack or loss of appetite for food

antianxiety--a group of drugs used to treat anxiety.

antiasthmatic--medicines used to treat asthma, which may be tablets, liquids, or aerosols (to be inhaled to get directly to the bronchial tubes rather than through the bloodstream).

anticonvulsant--a group of drugs prescribed to treat or prevent seizures (convulsions).

antihistamine--a family of drugs used to treat allergic conditions, such as hay fever, allergic conjunctivitis, itching, sneezing, runny nose, motion sickness, dizziness, sedation, insomnia and others.

antipsychotic—a group of drugs used to treat the mental disease of psychosis, such as schizophrenia, manic-depression [bi-polar disease], anxiety states, severe behavior problems and others.

aqueous floaters--spots before the eyes.

ataxia--failure of muscular coordination, irregularity of muscular action

blepharitis--inflammation of the eyelids

blepharospasm--sudden, involuntary muscular contraction of an eyelid

conjunctivitis--inflammation of the membrane lining the eyelids and covering the eyeball

dermatitis urticaria--inflammation of the skin, hives

diplopia--the perception of two images of a single object, double vision

edema--an abnormal accumulation of fluid in intercellar spaces of the body

exophthalmos--abnormal protrusion of the eye

hemianopia (hemianopsia)--defective vision or blindness in half of the visual field of one or both eyes

hemiparesis--slight or incomplete paralysis affecting one side of the body

hypotonia--diminished tone of the skeletal muscles

keratitis--inflammation of the cornea

lacrimation--secretion and discharge of tears

mydriasis--excessive dilation of the pupil

nystagmus--involuntary rapid movement of the eyeball

paresis--slight or incomplete paralysis

photophobia--abnormal visual intolerance to light

ptosis--drooping of the upper eyelid

scotomas--an area of depressed vision in the visual field, surrounded by an area of less depressed or normal vision

seizure--a sudden attack, as of disease or epilepsy

a. absence seizure (petit mal) - an epileptic seizure marked by a momentary break in the stream of thought and activity
b. akinetic seizure - absence or poverty of movement (Moebius syndrome)
c. focal seizure (partial or temporal lobe seizures) - begin in a particular area of the brain and exhibit symptoms related to that area (from Snell, 1989, p.157)
d. myoclonic seizure - repetitive, shocklike movement of muscles or a group of muscles
e. psychomotor seizure - show more complex behavioral symptoms, including chewing, lip smacking, picking at clothes and other purposeless activity (from McCubbin, 1989, p. 157).
f. tonic-clonic (grand mal) - a seizure in which a person loses consciousness and falls to the floor. He/she becomes rigid, or tonic, and then has rhythmical clonic contractions of all extremities. The individual may be incontinent. Breathing is often labored and may even stop for a short period of time. The entire seizure may last less than five minutes, and often the person has no memory of the episode (from McCubbin, 1989, p. 157).

vertigo-- a sensation of rotation or movement of one's self or of one's surroundings in any plane

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